

Aluminized P4 cathode-ray display tube using electrostatic focusing and approximately 90-degree magnetic deflection, with white short-to-medium persistence, ion-trap operation, and typical 12 kV anode supply.

GENERAL CHARACTERISTICS

BASE DESIGNATION	—	BASE PINS	—
NOMINAL HEATER	6.3 V / 600 mA	PARALLEL HEATER	— / —
HEATING	Indirect	SERIES OPERATION	Not specified
CATHODE ARRANGEMENT	Separate cathodes	SECTION CONSTRUCTION	Similar

SECTION RATINGS

SECTION1 Cathode Ray	
MAXIMUM PLATE VOLTAGE	15400 V
Published maximum ratings and characteristics promoted semantically from the approved source.	

14RP4A — Electrostatic-Focus Television Picture Tube

The **14RP4A** is a 14-inch, direct-viewed, rectangular glass television picture tube. It features a spherical faceplate, magnetic deflection, electrostatic focusing, and an external conductive coating. The primary distinction between the **14RP4A** and its sister designation, the **14RP4**, lies in the screen construction: while the standard **14RP4** uses a conventional P4 phosphor screen, the **14RP4A** is equipped with an aluminized P4 screen for enhanced brightness and performance.

Mechanical Construction and Physical Characteristics

The 14RP4A is designed with a rectangular glass envelope and a spherical faceplate made of gray filter glass. This filter glass provides a light transmittance of approximately 78%, which improves picture contrast under ambient room lighting.

Screen Dimensions and Area

- **Minimum Useful Screen Dimensions:** 12-1/16 x 9-1/2 inches
- **Minimum Useful Screen Area:** 104 square inches

Physical Connections and Alignment

- **Bulb Contact:** Recessed small cavity cap (J1-21)
- **Base:** Small shell duodecal 6-pin (B6-63)
- **Basing Configuration:** 12L
- **Weight:** Approximately 8.5 pounds

The tube's physical layout requires specific alignment during installation. The reference line of the tube is determined by the plane C-C' of a standard JETEC No. 116 reference line gauge when the gauge is resting on the glass cone. Base pin number 6 is aligned with the anode contact terminal (J1-21) within a tolerance of 30 degrees. Additionally, a 2" x 2" contact area for the external conductive coating is located 90 degrees counterclockwise from the anode contact, as viewed from the base end of the tube.

Electrical Specifications and Heater Characteristics

The 14RP4A utilizes an indirectly heated cathode. The heater is designed to operate under standard television receiver power conditions, featuring a controlled warm-up time to ensure compatibility with series-string heater circuits.

Heater Ratings

- **Heater Voltage:** 6.3 Volts
- **Heater Current:** $0.6 \pm 5\%$ Ampere
- **Heater Warm-up Time:** 11 seconds

The heater warm-up time is defined as the time required for the voltage across the heater terminals to increase to 5.0 volts when tested in a standard JETEC test circuit with a source voltage of 25 volts and a series resistance of 31.5 ohms.

Direct Interelectrode Capacitances

The direct interelectrode capacitances of the tube are approximately:

- **Cathode to All Other Electrodes:** 5 pF
- **Grid No. 1 to All Other Electrodes:** 6 pF
- **External Conductive Coating to Anode:** 1200 pF maximum, 800 pF minimum

The external conductive coating must be grounded during operation to serve as a high-voltage filter capacitor in conjunction with the internal anode coating.

Typical Operating Conditions and Focus Requirements

Under typical operating conditions, the 14RP4A operates with a nominal anode voltage of 12,000 Volts DC. The electrostatic focusing design allows the focus electrode (Grid No. 4) to be operated at or near ground potential, or adjusted within a range to achieve optimal spot sharpness.

Typical Operating Points

- **Anode Voltage:** 12,000 Volts DC
- **Grid No. 4 Voltage (Focusing Electrode):** -50 to +350 Volts DC
- **Grid No. 2 Voltage:** 300 Volts DC
- **Grid No. 1 Voltage (for Cutoff):** -26 to -70 Volts DC

Visual extinction of the focused raster occurs within the Grid No. 1 voltage range of -26 to -70 Volts. However, complete extinction of a stationary focused spot requires that the Grid No. 1 bias be made approximately 5 volts more negative than the raster cutoff value.

Ion Trap Magnet Requirements

The 14RP4A requires an external, single-field ion trap magnet to prevent ion burn on the phosphor screen.

- **Electromagnetic Ion Trap:** An average current of 35 mA DC is typical when using a JETEC Ion Trap Magnet No. 117, with its pole pieces centered over Grid No. 2 on the mount and rotated to achieve maximum screen brightness.
- **Permanent Magnet (PM) Ion Trap:** A permanent magnet ion trap must have a minimum field strength of 40 Gauss (assuming a typical PM ion trap magnet with a field strength tolerance of ± 3 gauss).

Absolute Maximum Ratings and Safety

The operating limits of the 14RP4A are defined under the Absolute Maximum system. Operating the tube beyond these limits can result in permanent damage or severely degraded performance.

Maximum Voltage and Resistance Ratings

- **Anode Voltage:** 15,400 Volts DC
- **Grid No. 4 Voltage (Focusing Electrode):** -550 to +550 Volts DC
- **Grid No. 2 Voltage:** 440 Volts DC
- **Grid No. 1 Voltage:**
 - *Negative Bias Value:* 120 Volts DC
 - *Negative Peak Value:* 175 Volts
 - *Positive Bias Value:* 0 Volts DC

- *Positive Peak Value: 2 Volts*
- **Peak Heater-Cathode Voltage:**
 - *Heater Negative with Respect to Cathode: 200 Volts*
 - *Heater Positive with Respect to Cathode: 200 Volts*
- **Grid No. 1 Circuit Resistance:** 1.5 Megohms maximum

X-ray Radiation Warning

Because the 14RP4A operates at high anode voltages, it is capable of generating X-rays. X-ray radiation shielding may be necessary to protect against the danger of personal injury from prolonged exposure at close range if the tube is operated at voltages higher than 16,000 volts or the maximum rated anode voltage of 15,400 Volts, whichever is less.

Technical Summary

The **14RP4A** is a 14-inch rectangular television picture tube featuring electrostatic focusing, magnetic deflection (85-degree horizontal and 90-degree diagonal deflection angles), and an aluminized P4 white-emitting phosphor screen. Operating with a 6.3 V, 0.6 A heater, the tube is designed for reliable performance in television receivers. It requires an external single-field ion trap magnet and a grounded external conductive coating. With a maximum anode rating of 15,400 Volts DC and a typical operating anode voltage of 12,000 Volts DC, the 14RP4A provides a compact, high-contrast display solution, while incorporating safety considerations for high-voltage operation and potential X-ray emission.



SOURCE OPERATING CONDITIONS

1950 Sylvania

Published test conditions and operating points. Values on this page are preserved as reported by this source.

1950 SYLVANIA

Section 1 · Cathode Ray

OTHER

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Maximum Plate Voltage	15400 V	—
Typical Anode Voltage	12000 V	—

CHARACTERISTIC

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Phosphor	P4	—
Focusing Method	Electrostatic	—
Deflecting Method	Magnetic	—



SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

1965 Sylvania Electronic Tubes Vol3

Published test conditions and operating points. Values on this page are preserved as reported by this source.

1965 SYLVANIA ELECTRONIC TUBES VOL3

Section 1 · Cathode Ray

CHARACTERISTICS

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Heater Voltage	6.3 V	—
Heater Current	600 mA	—
Focusing Method	Electrostatic text	—
Deflection Method	Magnetic text	—
Fluorescence	White text	—

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Persistence	Short to Medium text	—
Phosphor	Aluminized P4 text	—
Horizontal Deflection Angle	85 deg	Approximate
Diagonal Deflection Angle	90 deg	Approximate
Light Transmittance	78 percent	Approximate
Ion Trap	External Single Field text	—
Cathode-to-All Capacitance	5 pF	Approximate
Grid1-to-All Capacitance	6 pF	Approximate
External Coating-to-Anode Capacitance Minimum	800 pF	—
External Coating-to-Anode Capacitance Maximum	1200 pF	—

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Anode Voltage	12000 V	—
Grid2 Voltage	300 V	—
Ion Trap Magnet Current	35 mA	Representative
Ion Trap Field Strength	40 gauss	—
Maximum Anode Voltage	15400 V	—
Maximum Grid2 Voltage	440 V	—
Focus Voltage Minimum	-50 V	Grid4
Focus Voltage Maximum	350 V	Grid4
Grid1 Cutoff Voltage Minimum	-70 V	—
Grid1 Cutoff Voltage Maximum	-26 V	—
Maximum Grid1 Circuit Resistance	1.5 Mohm	—